REMARKS

In the Office Action dated September 19, 2007, claims 1-3 were rejected under 35 U.S.C. §102(e) as being anticipated by Ossmann et al. This rejection is respectfully traversed for the following reasons.

In general, Applicants respectfully submit the Ossmann et al reference is but one example of many hundreds, if not thousands, of medical imaging patents that disclose obtaining a number of 2D images and then combining those 2D images to form a 3D image. In the Ossmann et al reference, the 2D images happen to be ultrasound B-images, but this does not make the Ossmann et al reference any more relevant to the subject matter of the present application. Most importantly, however, independent claim 1 of the present application explicitly requires that the ultrasound scan of the body region of the patient, that exhibits spatial variations due to breathing motion, be conducted by coupling ultrasound radiation into the body region in *one stationary scan plane*. In substantiating the rejection of claims 1-3 as being anticipated by Ossmann et al, the Examiner did not even provide a citation to any portion of the Ossmann et al disclosure that the Examiner considers to correspond to this claim language, and in fact the Examiner appears to have overlooked or ignored this important limitation in claim 1, since the Examiner merely cited column 3, line 56 through column 4, line 7 of the Ossmann et al reference as providing a teaching involving "applying an ultrasound transducer arrangement to a body region of a patient exhibiting spatial variations due to motion artifacts and conducting an ultrasound scan of the region to obtain electric signals." Applicants do not deny that the Ossmann et al reference provides such a teaching, but, as noted above, this

teaching does not correspond to the language of independent claim 1 requiring that the ultrasound energy be applied in one stationary scan plane.

In fact, the Ossmann et al reference, like all other references of that type, proceeds based on a concept that is opposite to the subject matter of the present application. In conventional ultrasound scanning, of which the Ossmann et al reference is an example, a scan or image of a region of a patient exhibiting movement artifacts is obtained by obtaining multiple 2D images, which are combined to form a 3D image. Rather elaborate and complicated data processing must be then undertaken to compile the 3D image, because it is necessarily the case that the multiple 2D images must be obtained in succession, i.e. they cannot be all obtained simultaneously, and therefore, due to the motion of the subject, the content of each 2D image will be shifted slightly compared to immediately neighboring 2D images. These changes in image content due to motion artifacts must then be taken into account when reconstructing the 3D image.

The subject matter disclosed and claimed in the present application proceeds based on a completely different concept. In accordance with the present invention, ultrasound energy is coupled into the region of interest of the subject in one stationary scan plane, and successive B-images of the body region in this one stationary scan plane are then obtained. Due to the natural motion of the body region, such as due to respiration, relative to the stationary scan plane, the successive B-images that are obtained in accordance with the present invention will represent different slice planes of the body region. Therefore, it is not necessary to reorient the ultrasound transducer, or the ultrasound scan beam emanating therefrom, from slice-to-slice, as is conventional in references of the type

represented by Ossmann et al. instead, in accordance with the present invention, the ultrasound scanning takes place in one stationary scan plane and the natural motion of the body is used to generate successive B-images, which are then combined to form a three-dimensional image.

A more detailed distinguishing of the subject matter of claims 1-3 over the Ossmann et al disclosure is as follows.

As described at column 1, lines 7-9 and 15-17 in Ossmann et al, the purpose of the method disclosed therein is to eliminate movement artifacts in medical images. This means that the generated image should be, as much as possible, a précised snapshot of the patient at a given point in time. As stated at column 1, lines 18-25, it is known to couple the image acquisition point-in-time with a periodic body function of the patient, so as to implement phase-accurate, repeated image acquisitions.

As noted above, this general teaching of Ossmann et al describes the well known suppression of motion artifacts in medical images (snapshots), in the case where it is necessary to acquire multiple individual slice images for producing the 3D snapshot. These individual slice images are acquired in a phase-accurate manner by coupling the respective acquisition times with a periodic body function, such as respiration or heartbeat.

The contribution which the Ossmann et al reference makes with regard to this conventional manner of image acquisition is in the context of ultrasound acquisitions that will represent a moving image, in the form of a movie film (ciné representation). This is described at column 1, lines 25-28.

In the following passage at column 1, line 29 though column 2, line 67, the Ossmann et al reference describes the acquisition of a 3D moving image of a

patient, and states that each individual snapshot (slice) should be achieved, as much as possible without motion artifacts. This is accomplished by a suitable division of the imaging volume into sub-volumes, which are individually acquired in a periodic, time-synchronized manner relative to a particular periodic body movement (i.e., in a phase-accurate manner). In this context, the Ossmann et al reference is specifically concerned with the problems that occur at the boundary where two of these sub-volumes adjoin. This is considered to be a problem in the context of the Ossmann et al method because, as noted above, it is the goal of the Ossmann et al method to produce a moving image of the moving volume of the subject.

For actual 3D image acquisition, Ossmann et al teach, as stated at column 3, lines 60-62, the use of standard transducers with 2D arrays, as are well known in the art. These individual transducers are controllable in the azimuthal and elevation directions, according to column 4, lines 19-21. It is again stated in column 5, lines 23-25 and 51-53 that each image is acquired in a phase-synchronous manner with the body movement.

The actual 3D image generation in Ossmann et al thus ensues in a conventional manner, by controlling a 2D array in terms of its viewing direction, in order to sweep over or through 3D body region of interest in the patient. Artifacts in the resulting image due to body movement of the patient are eliminated by the aforementioned phase synchronization.

As noted above, this is opposite to the underlying concept of the present invention, wherein ultrasound energy is coupled into a subject in one stationary scan plane, and the natural movement of the body within scan plane is used to generate

the successive B-images. No such disclosure is present in the Ossmann et al reference.

Therefore, the Ossmann et al reference does not disclose all of the elements of claims 1-3 as arranged and operating in those claims, and thus does not anticipate any of those claims under 35 U.S.C. §102(e). Claims 1-3 are therefore submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required, or to credit any overpayment to account No. 501519.

Submitted by,

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